

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>41860 - 205200</b>	<b>FOR FURTHER ACTION</b> <small>see Form PCT/ISA/220 as well as, where applicable, item 5 below.</small>	
International application No. <b>PCT/US2004/022605</b>	International filing date (day/month/year) <b>14/07/2004</b>	(Earliest) Priority Date (day/month/year) <b>14/07/2003</b>
Applicant <b>INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 11 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the report**

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. ☒ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☒ **Certain claims were found unsearchable** (See Box II).

3. ☒ **Unity of invention is lacking** (see Box III).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

a. the figure of the **drawings** to be published with the abstract is Figure No. \_\_\_\_\_

☐ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

b. ☒ none of the figures is to be published with the abstract.

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International application No.

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**Box No. I Nucleotide and/or amino acid sequence(s) (Continuation of item 1.b of the first sheet)**

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, the international search was carried out on the basis of:

a. type of material

☒

a sequence listing

☐

table(s) related to the sequence listing

b. format of material

☒

in written format

☒

in computer readable form

c. time of filing/furnishing

☒

contained in the international application as filed

☒

filed together with the international application in computer readable form

☐

furnished subsequently to this Authority for the purpose of search

2.

☐

In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

3.

Additional comments:

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International application No.  
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## Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:  
see FURTHER INFORMATION sheet PCT/ISA/210
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:  
1-73, 75-76, 79-83 (completely), 78 (partially)
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.1

Although claims 55-58 are directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.

Although claims 59-60 are directed to a diagnostic method that can be practised on the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-11, 24-28, 39-72 (all partially); 12, 17,18,19, 29, 34 (completely)

Isolated polypeptide Tp1 comprising a sequence represented by SEQ ID NO: 1 and the antigenic fragments SEQ ID NOs: 6, 7 and 9, pharmaceutical or immunogenic composition or vaccine comprising said polypeptide, isolated polynucleotide comprising SEQ ID NO. 18 or 23 pharmaceutical composition comprising said polynucleotide, vector comprising said polynucleotide, host cell comprising said vector, method of producing a polypeptide, comprising culturing said host cell, antibody specific for the polypeptide having SEQ ID NO: 1, 6, 7 or 9, kit comprising said antibody, method for protecting an animal against infection by T. parva, comprising administration of said polypeptide or of said host cell, method of detecting protozoan infection, method for preparing a polyclonal or monoclonal antibody against said polypeptide, method for identifying T. parva in a sample

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2. claims: 1-11, 24-28, 39-72 (all partially); 13, 20, 30, 35 (completely)

same as (1), but polypeptide Tp4 comprising a sequence represented by SEQ ID NO: 2 and antigenic fragment SEQ ID NO: 14, polynucleotide comprising SEQ ID NO: 19 and 28.

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3. claims: 1-11, 24-28, 39-72 (all partially), 14, 21, 31, 36, 37 (completely)

as (1), but polypeptide Tp5 comprising SEQ ID NO: 3 and the antigenic fragment SEQ ID NO: 15 and polynucleotides comprising SEQ ID NO. 20, 29 and 30.

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4. claims: 1-11, 24-28 and 39-72 (all partially), 15, 22, 32 (completely)

as (1); but polypeptide Tp7 comprising SEQ ID NO: 4, the antigenic fragment SEQ ID NO: 16 and polynucleotide comprising SEQ ID NO: 21.

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5. claims: 1-11, 24-28, 39-72 (all partially); 16, 23, 33, 38 (completely)

as (1); but polypeptide Tp8 comprising SEQ ID NO: 5, the antigenic fragment SEQ ID NO: 17 and polynucleotide comprising SEQ ID NO. 22 and 31.

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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

6. claims: 73, 75-76, 79-83 (completely); 78 (partially)

Method for the identification of parasite antigens that are targets of cytotoxic T cells.

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7. claims: Claims 74, 77, 84, 85 (completely), 78 (partially)

Method for a three-way matrix resolution for identification of a single cDNA clone from a pool of cDNAs.

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# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US2004/022605

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C07K14/44 C12N15/30 A61K39/018 G01N33/569 C07K16/20  
C12N15/10

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C07K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, BIOSIS, Sequence Search, WPI Data, PAJ, EMBASE

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	<p>DATABASE EMBL 'Online! 2 January 2003 (2003-01-02), "EST629769 TpMugugaSh01 Theileria parva cDNA clone TPFAU35, mRNA sequence." XP002310756 retrieved from EBI accession no. EM_EST:BQ546142 Database accession no. BQ546142 the whole document</p> <p style="text-align: center;">----- -/--</p>	24-27, 29
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents :

\*A\* document defining the general state of the art which is not considered to be of particular relevance

\*E\* earlier document but published on or after the international filing date

\*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

\*O\* document referring to an oral disclosure, use, exhibition or other means

\*P\* document published prior to the international filing date but later than the priority date claimed

\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

\*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

\*&\* document member of the same patent family

Date of the actual completion of the international search

8 April 2005

Date of mailing of the international search report

09.05.2005

Name and mailing address of the ISA

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>GERHARDS JOACHIM ET AL: "Sequence and expression of a 90-kilodalton heat-shock protein family member of Theileria parva" MOLECULAR AND BIOCHEMICAL PARASITOLOGY, vol. 68, no. 2, 1994, pages 235-246, XP002310752 ISSN: 0166-6851 the whole document page 236, right-hand column, last paragraph - page 237, left-hand column, paragraph 1 -&amp; DATABASE EMBL 'Online! 21 February 1991 (1991-02-21), "T.parva heat shock protein 90 (hsp90) mRNA, complete cds." XP002323332 retrieved from EBI accession no. EM_INV:TPHSP90 Database accession no. TPHSP90 the whole document</p>	<p>1-7,10, 11,15, 24-28, 32, 40-45, 47-51, 63-66</p>
X	<p>----- DATABASE EMBL 'Online! 2 January 2003 (2003-01-02), "EST630891 TpMugugaSh01 Theileria parva cDNA clone TPFDB90, mRNA sequence." XP002323333 retrieved from EBI accession no. EM_EST:BQ547264 Database accession no. BQ547264 the whole document</p>	<p>24-27,31</p>
X	<p>----- GARDNER M J ET AL: "GENOME SEQUENCE OF THE HUMAN MALARIA PARASITE PLASMODIUM FALCIPARUM" NATURE, MACMILLAN JOURNALS LTD. LONDON, GB, vol. 419, 2002, pages 498-511, XP001156336 ISSN: 0028-0836 the whole document -&amp; DATABASE UniProt 'Online! 1 March 2003 (2003-03-01), "Translation initiation factor eIF-1A, putative." XP002323334 retrieved from EBI accession no. UNIPROT:Q8IHT2 Database accession no. Q8IHT2 the whole document</p> <p>----- -/--</p>	<p>1,3,21</p>



# INTERNATIONAL SEARCH REPORT

International Application No

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>DATABASE EMBL 'Online!  2 January 2003 (2003-01-02), "EST630890  TpMugugaSh01 Theileria parva cDNA clone  TPFDB90, mRNA sequence."  XP002323335  retrieved from EBI accession no.  EM_EST:BQ547263  Database accession no. BQ547263  the whole document</p>	24-27, 36
X	<p>DATABASE EMBL 'Online!  2 January 2003 (2003-01-02), "EST630359  TpMugugaSh01 Theileria parva cDNA clone  TPFAY47, mRNA sequence."  XP002323336  retrieved from EBI accession no.  EM_EST:BQ546732  Database accession no. BQ546732  the whole document</p>	24-27, 38
X	<p>DATABASE EMBL 'Online!  2 January 2003 (2003-01-02), "EST628661  TpMugugaSh01 Theileria parva cDNA clone  TPFAM54, mRNA sequence."  XP002323337  retrieved from EBI accession no.  EM_EST:BQ545034  Database accession no. BQ545034  the whole document</p>	24, 27
X	<p>BALLINGALL K T ET AL: "A highly  sensitive, non-radioactive assay for T  cell activation in cattle: applications in  screening for antigens recognised by  CD4&lt;+&gt; and CD8&lt;+&gt; T cells"  JOURNAL OF IMMUNOLOGICAL METHODS, ELSEVIER  SCIENCE PUBLISHERS B.V., AMSTERDAM, NL,  vol. 239, no. 1-2, May 2000 (2000-05),  pages 85-93, XP004204319  ISSN: 0022-1759  page 90, right-hand column, line 15 - page  92, left-hand column, line 27</p>	73, 75, 76, 78-83
A	<p>MORRISON W IVAN ET AL: "Theileriosis:  Progress towards vaccine development  through understanding immune responses to  the parasite"  VETERINARY PARASITOLOGY,  vol. 57, no. 1-3, 1995, pages 177-187,  XP002310754  ISSN: 0304-4017  cited in the application  page 184, last paragraph - page 185,  paragraph 1</p>	1

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# INTERNATIONAL SEARCH REPORT

International Application No  
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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>MCKEEVER DECLAN J ET AL: "Novel vaccines against Theileria parva: Prospects for sustainability" INTERNATIONAL JOURNAL FOR PARASITOLOGY, vol. 28, no. 5, May 1998 (1998-05), pages 693-706, XP002310753 ISSN: 0020-7519 page 702, left-hand column, last paragraph - page 703, left-hand column, paragraph 1 -----</p>	1
A	<p>US 5 273 744 A (NANTULYA VINAND M ET AL) 28 December 1993 (1993-12-28) cited in the application column 3, line 50 - column 4, line 4; claims 1-14 -----</p>	1

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US2004/022605

Patent document  
cited in search report

Publication  
date

Patent family  
member(s)

Publication  
date

US 5273744

A

28-12-1993

NONE